ATPD 2203 Revision F
17 May 2007

PURCHASE DESCRIPTION
CONTAINER HANDLING UNIT (CHU)

This description is approved for use within the USA Tank-Automotive and Armaments Command and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This is a description of the Container Handling Unit Kits that attach to the Palletized Load System (PLS) Truck M1075 (basic model only) and the HEMTT-LHS (M1120 all variants, including the M1120A4) using the Load Handling System (LHS) as the lifting and loading mechanism. These kits allow the PLS truck and HEMTT-LHS to pick up and transport 20 foot IS0 containers.

CHU Kits. The CHU kits defined by this purchase description are as follows:

KIT	NATIONAL STOCK NUMBER
M1075 PLS CHU Kit	TBD
M1120 HEMTT-LHS CHU Kit	TBD

BENEFICIAL COMMENTS (RECOMMENDATIONS, ADDITIONS, and DELETIONS) AND ANY PERTINENT DATA WHICH MAY BE OF USE IN IMPROVING THIS DOCUMENT SHOULD BE ADDRESSED TO: U.S. ARMY TANK-AUTOMOTIVE COMMAND, ATTN: SFAE-CSS-TV-H, WARREN, MI 48397-5000, BY USING A LETTER.

AMSC N/A FSC

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this purchase description. This section does not include documents cited in other sections of this purchase description or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this purchase description, whether or not they are listed.

2.2 Government Documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards, and handbooks form part of this purchase description to the extent specified herein. Unless otherwise specified, the issue of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation. (see 6.2)

SPECIFICATIONS

FEDERAL

TT-C-490	- Cleaning Methods for Ferrous Surfaces and Pretreatments for Organic Coatings
A-A-50271	- Plate, Identification

MILITARY

MIL-PRF-10924	- Grease, Automotive and Artillery
MIL-DTL-53072	- Chemical Agent Resistant Coating (CARC) System Application Procedures and Quality Control Inspection

STANDARDS

MILITARY

MIL-STD-209	- Interface Standard for Lifting and Tiedown Provisions
MIL-STD-1366	- Interface Standard for Transportability Criteria

(Unless otherwise indicated, copies of federal and military specifications, standards and handbooks are available from Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 191 1 1-5094.)

2.2.2 Other Government Documents, Drawings and Publications. The following other Government documents, drawings and publications form part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

PURCHASE DESCRIPTIONS

U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENT COMMAND

ATPD 2304 - Detailed Purchase Description for the Off-Road Family of Vehicles (1 1 Ton to 16.5 Ton payloads) and the Heavy Expanded Mobility Tactical Truck (HEMTT) Extended Service Program (ESP)

(Application for copies should be addressed to the U.S. Army Tank-automotive and Armaments Command, ATTN:AMSTA-LC-CHAA ,6501 E. 11 Mile Road, Warren MI 48397-5000)

DEPARTMENT OF LABOR (DOL)

29 CFR 1910 - Occupational Safety and Health Standards (OSHA)

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

NATIONAL HIGHWAY SAFETY ADMINISTRATION

Federal Motor Vehicle Safety Standards (FMVSS)

FMVSS 108 - Lamps, reflective devices and associated equipment

(Application for copies should be addressed to the Dept. of Transportation, Federal Highway Administration, Washington DC 20591)

2.3 Non-Government Publications. The following documents form part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

IS0 668 - Series 1 Freight Containers - Classification, Dimensions and Ratings

IS0 830 - Freight Containers – Vocabulary

IS0 1161 - Series 1 Freight Containers - Corner Fittings

(Application for copies should be addressed to International Organization of Standardization (ISO), Case Postale 56, Geneva, Switzerland CH-1211)

National Electrical Manufacturers Association (NEMA)

2535.4 - Product Safety Signs and Labels

(Application for copies should be addressed to National Electrical Manufacturers Association (NEMA), 1300 N 17th Street; Suite 1847, Rosslyn, VA 22209)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

J163 - Low Tension Wiring and Cable Terminals and Splice Clips
J534 - Lubrication Fittings
J1100 - Motor Vehicle Dimensions
J1128 - Low Tension Primary Cable

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.)

AMERICAN WELDING SOCIETY, INC. (AWS)

D1.1 - Structural Welding Code - Steel
D1.2 - Structural Welding Code - Aluminum
D1.3 - Structural Welding Code - Sheet Steel
D14.3 - Specification for Welding Earthmoving and Construction Equipment

(Application for Copies should be addressed to the American Welding Society, Inc., 2501 NW Seventh St., Miami, FL 331 25.)

NORTH ATLANTIC TREATY ORGANIZATION (NATO) MILITARY AGENCY FOR STANDARDIZATION (MAS)

STANAG 241 3 - Demountable Load Carrying Platforms (DLCP/Flatracks)

(Applications for copies of NATO publications should be addressed to NATO, MIL Agency for Standardization (MAS), 35 Chesam Place, London SWI, England)

GERMAN INDUSTRIAL STANDARDS

DIN 30722	- Pay-off Dump Trucks up to 32t (Flatrack critical dimensions)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents may also be available in or through libraries or other information services.)

2.4 Order of Precedence. In the event of a conflict between the text of this document and the references cited herein the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 System Description. This document describes Container Handling Units (CHUs) for use with the M1075 PLS truck and the M1120 HEMTT-LHS. The CHU shall provide an interface between the PLS Load Handling System (LHS)/HEMTT-LHS and International Organization for Standardization (ISO) compatible container, flatrack, or shelter having a length of 20 feet (6058 mm), width of 8 feet (2438 mm) and a minimum height of 8 feet (2438 mm) to a maximum height of 8 feet 6 inches (2591 mm), herein referred to collectively as a container. Further more, the containers will comply with IS0 668 "Series 1 Freight Containers - Classification, Dimensions and Ratings" and IS0 1161 "Series 1 Freight Containers - Corner Fittings Specification". The interface between the LHS and the container hereafter shall be referred to as the Front Lift Adapter (FLA). Any changes to the LHS shall be minimal and shall not affect the form, fit or function of the LHS and shall not affect the flatrack mission of the PLS or HEMTT-LHS. The LHS shall meet the requirements of ATPD 2304 and STANAG 2413 after any modifications have been made. The CHU shall provide support and guidance to load, unload and transport containers locking the container to the truck utilizing the container's IS0 corner fittings.

The CHU shall be capable of operating as defined in 3.3, 3.4 and 3.5 and their subparagraphs and shall not interfere with any components, parts or the operation of the PLS truck and HEMTT-LHS nor degrade operational capabilities, as defined in ATPD 2304 and 6.3.5.2, when stowed or in operational configuration. PLS and HEMTT-LHS interface points shall be maintained in accordance with STANAG 241 3, Annex A "Interoperable Flatrack Main Dimensions" (Attachment 1) and the requirements of DIN 30722. The CHU shall be designed so that no moving part of the trucks contact the CHU while traversing all terrains and at speeds in accordance with the PLS and HEMTT-

LHS mission profiles (ATPD 2304 and 6.3.5.2). No part of the CHU or the container loaded by the CHU shall interfere with the coupling of the PLS trailer to the PLS truck, HEMTT-LHS/PLS-trailer or the operation of the PLS truck trailer and HEMTT LHS/PLS trailer combination. The service life of the CHU shall be 20 years.

3.2 First Article Test (FAT). When required by contract the Government shall conduct a FAT IAW the contract requirements.

3.3 Materials, Processes and Workmanship.

3.3.1 Materials. All materials shall be new. Used, rebuilt or remanufactured components, pieces and parts shall not be incorporated into the CHU. Materials which are recycled (remelted) to make new materials are allowable. All structural fasteners shall be at minimum Grade 5 fasteners.

3.3.2 Corrosion Control. The CHU shall be capable of operation in a military environment including extended periods in high humidity, salt spray, road deicing chemicals, atmospheric contamination, gravel impingement and temperature extremes. Surfaces not painted or subject to relative movement or wear shall be alternatively protected from corrosion. There shall be no corrosion requiring repair or replacement of parts between scheduled maintenance. Dissimilar metals (6.3.6) shall be electrically insulated from one another to prevent galvanic corrosion (6.3.7). No actions beyond normal washing, scheduled maintenance and replacement of damaged paint shall be necessary to keep the corrosion prevention in effect. Corrosion protection method shall not be applied as a top coat over CARC except for shipments where transoceanic coatings are specified by contract.

3.3.3 Treatment and Painting. The CHU shall be cleaned, treated, primed and painted in accordance with MIL-DTL-53072 After cleaning, treating and priming all metal surfaces shall be painted in accordance with MIL-DTL-53072, Black - chip #37030. Surfaces not painted shall be treated against corrosion or shall be fabricated of materials not requiring treatment. Hydraulic cylinder rods, seals, and removable pins shall not be painted.

3.3.4 Identification and Marking. Plates, IAW A-A-50271, shall be provided and installed in a readily visible location. All plates shall be attached with screws, bolts or rivets.

3.3.4.1 Identification and Data Plates. An identification (name) plate shall be provided and located in a readily visible location when the CHU is installed. The contents of the plate, letter sizes and general arrangements are shown in Figure 1. There shall be no evidence of paint on the plate.

3.3.4.2 Caution, Instruction and Operating Plates. The CHU shall be equipped with instructions, plates or diagrams, including cautions and warnings describing any special or important procedures to be followed in assembling, operating or servicing. Caution plates shall include, but are not limited to, identification of the overall height of the truck when carrying 8 and 8.5 foot containers and the maximum payload (container and cargo). The plate showing maximum height and maximum payload shall be readily visible with the CHU in the operational (container) mode. Warnings shall comply with NEMA 2535.4.

3.3.5 Workmanship. All parts, components, and assemblies of the CHU including castings, forging, molded parts, stampings, machined surfaces, and welded parts shall be clean and free from any defects that will reduce the capability of the CHU to meet the requirements specified herein. Any components and assemblies which have been repaired or modified to overcome deficiencies shall not be used without prior specific approval of the procuring contracting officer (PCO). External surfaces shall be free from burs, slag, sharp edges, and corners except where sharp corners and edges are required. Any area in which hydraulic or electrical lines pass shall be radiuses so as to prevent wearing and cutting. All hydraulic lines shall be mounted and secured to prevent chaffing due to relative motion.

3.3.6 Metal Fabrication. Metal used in the fabrication of the CHU shall be free from kinks and sharp bends. The forming of material shall be done by methods that will not cause injury to the metal. Flame cut material and welds shall be free of slag. All bends of a major character shall be made with controlled means in order to insure uniformity of size and shape. Precautions shall be taken to avoid overheating.

3.3.7 Welding. Welded connections shall conform to AWS Dl .l, Structural Welding Code, Steel, AWS D1 .2 Structural Welding Code, Aluminum, AWS D1.3 Structural Welding Code, Sheet Metal or AWS D14.3 Specification for Welding Earthmoving and Construction Equipment as applicable.

3.3.8 Parts Interchangeability. The PLS CHU kit and the HEMTT-LHS CHU kit shall have a minimum of 75% of their parts in common (by part count).

3.3.8.1 FLA Interchangeability. The PLS FLA and HEMTT FLA shall be 100% interchangeable. Any items on one version of the FLA that are not on the other version of the FLA shall be capable of being removable and installed on the other version of the FLA using unit level maintenance tools and / or BII.

3.4 Performance Characteristics. The PLS truck is capable of operating with loads up to 36,250 pounds without permanent deformation. The HEMTT-LHS is capable of operating with loads (including flatrack and Front lift adapter) up to 26,000 pounds without permanent deformation. All operations shall take place from curb weight to gross vehicle weight. The center of gravity (CG) of the

container for both PLS CHU and HEMTT-LHS CHU shall be located no greater than 31 inches above the base of the IS0 container (bottom of the bottom corner castings). Both PLS and HEMTT-LHS CG shall be within 2 inches of the side to side center (8' width). Longitudinally, the PLS CG shall be within 12 inches of the end to end center (20' length) of the IS0 container. Longitudinally, the HEMTT-LHS CG shall be located between 94 and 100 inches in from the inside front wall of the IS0 container.

3.4.1. Loading and Unloading. The CHU shall align the FLA with the container after the operator has positioned the truck. The FLA shall be crew adjustable, for container heights of 8' (2438 mm), and 8'6" (2591 mm) the FLA shall be capable of engaging containers on 10% ground slopes (pitch), when the centerline of the container is 0% to 10% on either side of the centerline of the PLS truck and HEMTT-LHS (yaw) and when the container has 10% of roll relative to the trucks. The conditions can occur independently, all at once or any combination of the three. The trucks shall be descending, ascending or horizontal to the slope and above or below the container, with the container on the slope. The CHU shall engage the container's corner castings and lift the container, at the respective vehicle rated payload, onto the trucks. The CHU shall automatically guide and center the container on the truck when loading. The CHU shall be capable of unloading a container, at its respective vehicle rated payload, to ground slopes of 10% with the truck either horizontal or on the slope. The CHU shall guide the container off of the PLS truck and HEMTT-LHS to prevent damage to the truck, LHS, container and CHU. The automatic mode of the LHS shall be for loading and unloading containers.

3.4.2 Engagement Height. The CHU shall be capable of engaging, lifting and loading containers, when the bottom of the container is resting on a surface that is between 12 inches below and 5 feet above ground level. Ground level shall be defined as the plane upon which the wheels of the trucks are resting.

3.4.3 Locking. The CHU shall provide locks to secure the container to the PLS truck and HEMTT-LHS truck and the FLA to the container using the container's corner castings. The container shall remain positively attached to the trucks in its designed transport position when ascending and descending a 30% grade, traversing a 30% side slope with intermediate starts and stops and during all phases of the PLS and HEMTT-LHS trucks' mission profile as defined in 6.3.5.2 and ATPD 2304, Tables VI and VII "20,000 Mile Durability Test Profile". The locks shall remain positively engaged until the operator unlocks the container from the truck and the FLA from the container. It is desirable that there be a lockout that allows unloading to begin only when the transit locks are disengaged. Transit locks are the locks used to secure the container during transport and are not used during the loading and unloading of the container.

3.4.4 Reserved

3.4.5 Operational Times. The time necessary to lock the CHU to a container, load the container onto the truck and lock down the container for transport shall not exceed five (5) minutes for two soldiers. The time necessary to unload the container from the truck to the ground and disconnect the front lift adapter from the container shall not exceed five (5) minutes for two soldiers. The loading time shall be measured from the moment the CHU contacts the container or from when the first task required by the CHU is performed until the container is loaded, the "LHS NO TRANSIT" light turns off, and the transit locks are engaged. The unloading time shall be from when the operator disengages the transit locks until the container is on the ground and the CHU is completely disconnected from the container.

3.4.6 Deployment and Stowage Times. The time required to deploy the CHU from stowed (flatrack) to operational mode shall not exceed fifteen (15) minutes for one MOS 88M or 55B soldier and ten (10) minutes for two MOS 88M or 558 soldiers. This includes the deployment of the FLA from its stowed position. Minimum strength requirements of the MOS 88M and 55B soldiers shall not be exceeded (6.3.8). The time required to stow the CHU, including the FLA, shall not exceed fifteen (15) minutes for one MOS 88M or 55B soldier and ten (10) minutes for two MOS 88M or 55B. Deployment and stowage shall not require the use of tools or other assets external to the truck.

3.4.7 CHU Stowage. The entire CHU shall be stowable on the truck upon which it is installed. When in the stowed position, the CHU shall not interfere with the loading/unloading of any flatrack built in accordance with STANAG 2413 (Attachment I), any truck components or the operation of the truck nor degrade the operational capabilities of the truck.

3.4.7.1 FLA Stowage. The FLA, when removed from the hook shall be capable of being positioned in a freestanding configuration on unimproved terrain with a maximum slope of 10% and a minimum RCI of 43.

3.4.8 Reserved

3.4.9 Environmental Conditions. The CHU shall be capable of operation in all operational environments of the PLS truck and HEMTT-LHS defined in ATPD 2304 and includes high humidity, salt spray, road deicing chemicals, atmospheric contamination, gravel impingement and temperature extremes. Different grades of lubricants may be used at different temperature extremes.

3.4.9.1 Physical Environment. The CHU shall be designed to prevent or be unaffected by the collection of snow, ice, rain, sand, mud or dust on components. The CHU shall be capable of retrieving containers when the bottom corner castings are submerged up to 6 inches above the top of the casting in mud, unpacked snow or sand.

3.5 Physical Characteristics.

3.5.1 Installation. The initial installation of the CHU onto a M1075 PLS truck or M1120 HEMTT-LHS shall be accomplished with the tools and resources available to Organizational Maintenance. All hardware necessary to install the CHU and make it operationally ready shall be part of the installation kit. The CHU shall be bolted to the truck and LHS using existing holes. There shall be no cutting, drilling or grinding performed on the truck. Grinding for the necessary removal of paint is acceptable. Welding may be required to mount the proximity switch brackets and flags on the PLS and HEMTT-LHS.

3.5.2 Weight. The increase in curb weight to both the PLS and the HEMTT-LHS after the installation the CHU kit, including the FLA shall not exceed 3400 Pounds (Threshold) or 3100 Pounds (Objective).

3.5.2.1 FLA Weight. The weight of the FLA, when the CHU is ready to start container operations, shall not exceed 1400 Pounds (Threshold) or 1300 Pounds (Objective).

3.5.3 Dimensions.

3.5.3.1 Height. The CHU shall be designed so that the PLS and HEMTT-LHS trucks, while carrying an empty 8' (2.4 m) container and with the truck's tires inflated to "highway" pressure, shall have a height of no more than 14' (4.27 m).

3.5.3.2 Width. The PLS and HEMTT-LHS trucks with the CHU stowed and while transporting a container shall not be wider than 102" (2591 mm) when measured in accordance with SAE J1100 excluding mirrors and marker lamps, but including bumpers, moldings, and sheet metal protrusions.

3.5.3.3 Length. The CHU, with the LHS in the transit position, shall not extend from the back of the PLS truck more than 35 inches measured from the vertical surface of the rear cross member. The CHU and payload shall not degrade the ability of the truck to meet the rear lighting requirements of FMVSS Number 108.

3.5.3.4. Approach and Departure Angles. The approach and departure angles of the truck with the CHU installed and in the operational configuration, shall not be less than 32 degrees. Angles shall be defined in accordance with SAE J1100.

3.5.4 Fatigue. The CHU shall be designed to withstand (no cracks or permanent deformation) 3000 loading and unloading cycles and the transport of containers at a gross weight (6.3.3) throughout the PLS and HEMTT mission profiles. The weight shall be distributed in three manners over the length of the container. The weight shall be distributed uniformly over the entire length, uniformly over the front three-fourths of the length, and uniformly over the rear three-fourths of the

length. No deformation or damage shall occur to the container, PLS truck or CHU when the containers are loaded and unloaded in accordance with 3.4. The CHU shall be mounted in such a manner as to prevent damage or permanent deformation to the PLS truck. There shall be no evidence of accelerated wear or failures of the CHU and PLS truck when tested under all conditions specified herein.

3.5.6 Lubricants and Fittings. The CHU shall be delivered fully lubed and shall be operable on GAA, as required by MIL-PRF-10924 without adverse affect on the CHUs on, PLS truck or HEMTT-LHS. All grease lubrication shall conform to MIL-PRF-10924, all lubrication fittings shall conform to SAE J534, be inherently protected from the accumulation of mud and other debris and directly accessible. The lube fittings shall be mounted in an area providing protection from incidental impact. Permanently lubed components shall be preferable to components requiring scheduled maintenance lubrication.

3.5.7 Electrical System. Any electrical connections between the cab and external CHU components shall be via a bulkhead, steel or hard plastic waterproof connector, adaptable to existing truck connectors. All electrical components shall be waterproof and the connectors shall be steel or hard plastic waterproof connectors. The electrical draw shall not exceed 10 amps 12V or 10 amps 24V. All wiring provided shall be in accordance with SAE J1128. Wiring shall be protected from accidental contact with troops, terrain or vegetation and shall be a minimum of 14 gauge. Electrical splices and terminals shall conform to SAE J163.

3.5.8 Human Factors Engineering. The characteristics of the CHU shall provide for the operation by MOS 88M and 55B personnel. The operation of the CHU, including stowing and deploying, shall not exceed the physical capabilities of the MOS 88M and 558 (6.3.8). The CHU shall be operable by MOS 88M and 55B soldiers while wearing the full range of Army clothing, including Arctic and MOPP IV clothing. It is desired that all operations that must be performed outside of the cab, be accomplished from the ground. In the event all tasks cannot be accomplished from the ground integral steps and handholds shall be part of the CHU.

3.5.9 Safety. The CHU shall comply with the applicable parts of OSHA 29 CFR PART 191 0 SUBPARTS A, B, D, G, H, J, M, O, S, and Z. Operators and maintenance personnel shall not be unknowingly exposed to reciprocating, rotating or moving parts, hot surfaces, components containing high pressures or other inherently hazardous components or systems. Hot surfaces that create a fire hazard shall be fully guarded or insulated. Electrical equipment shall be effectively guarded and grounded to protect all persons and objects from electrical shock hazard. Nonfunctional sharp edges, projecting points, and excessive length of fastening devices shall be eliminated. Consideration should be given to expected failure mode situations in addition to normal operation. The

CHU and its stowage methods shall be designed such that personnel are not required to be in a position where an injury could be caused by a falling or collapsing part. Precipitation in the form of rain or snow shall not cause hazards from electrical, reciprocating, or rotating parts.

3.5.10 Transportability. The CHU shall not degrade the transportability nor interfere with the lifting and tiedown procedures of the PLS truck and HEMTT-LHS. The PLS truck and HEMTT-LHS with CHU components attached in the stowed position and carrying a loaded flatrack shall pass a rail impact test in accordance with Appendix A. The PLS truck and HEMTT-LHS with CHUS (FLA) attached, in the deployed position, and carrying a container loaded to gross payload weight, shall pass a rail impact test in accordance with Appendix A.

3.5.11 Maintainability. Provisions shall be made for ease in adjusting, servicing or replacing parts and components. It is desired that all maintenance be performed by the maintainer while standing on the ground. In the event all tasks cannot be accomplished from the ground integral steps and handholds shall be part of the CHU. Parts that require regular maintenance or service actions shall be directly accessible by the maintainer. The CHU shall not interfere with the maintenance of the PLS or HEMTT-LHS trucks.

3.5.11.1 Maintenance Ratio. The CHU shall have a maintenance ratio no greater than 0.0560 Man hours/cycles which shall include both scheduled and unscheduled maintenance. The maintenance ratio shall also include repair of the anti-corrosion system necessary to keep the corrosion protection in affect.

3.5.11.2 Durability. The CHU shall be designed to withstand 3,000 continuous load/unload cycles at GVW (36,250 lbs.) and 6,000 transport miles over the PLS and HEMTT mission profile, in all payload/stowed configurations. There shall be no hardware failures of CHU major components which includes but is not limited to slides, rollers, FLA, bail bar, container locks (pins, hooks, twist locks.), when tested as specified in 4.5.12. Durability failures are defined as any damage, cracking, or permanent deformation of the CHU's major components that causes degradation of its function, impairs ability to perform its intended mission, and/or pose a safety risk to the operator.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or this specification, the contractor may use his/her own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any inspections set forth in this purchase description where such inspections are

deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for Compliance. In addition to Section 4, items must meet all requirements of Sections 3 and 5. The inspections set forth in this purchase description shall become part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the purchase description shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government, for acceptance, comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Government Verification. All quality assurance operations performed by the contractor will be subject to Government verification at unscheduled intervals. Verification will consist of; (a) surveillance of operations to determine that practices, methods, and procedures within the written quality assurance system plan are being properly applied, and (b) Government product inspection to determine the product meets all requirements herein before being offered for acceptance. Deviation from the prescribed procedures or instances of poor manufacturing practices, which might have an adverse effect upon the quality of the product, will immediately be called to the attention of the contractor. Failure of the contractor to promptly correct deficiencies shall be cause for suspension of acceptance until corrective action has been made or until conformance of the product to prescribed criteria has been demonstrated.

4.1.3 Parts and Components. When requested, the contractor shall make available for inspection, legible drawings and printed specifications to which the end item or any parts/components were manufactured. Such drawings and specifications shall be annotated to reflect the latest revision incorporated therein. Upon completion of inspection(s) by the Government, all drawings and specifications will be returned to the contractor. The Government reserves the right to inspect end items or any parts/components during all manufacturing processes and reject such material that does not conform to either Government or contractor drawings/specifications. All deficiencies detected during any contractor or Government inspection (end item or in-process) shall be corrected by the contractor at no cost to the Government. During any Government inspection, the contractor shall provide inspection assistance upon request.

4.1.4 Certification Requirements. In 4.1.5 (inclusive) of this document, the contractor is required to certify that specified requirements have been met. This is usually done in lieu of a government examination or test. Details as to the requirements for a certification and recertification shall be found in section 4 (inclusive) of this document and the contract.

4.1.5 Classification of Inspections. The inspection requirements specified herein are classified as follows (ref Table I):

a. First Production Unit inspection (FPUI) (4.2.1).
b. Production Verification Test (PVT) (4.2.3).
c. Quality Conformance Inspection (QCI) (4.2.4).
d. Follow-On Production Test (FPT) (4.2.5).

TABLE I

CLASSIFICATION OF EXAMINATIONS AND TESTS

The examinations/tests referenced in this table may be modified at the discretion of the Government by the deletion or addition of inspections to assure adherence to specifications/contractual requirements.

TEST LOCATION

First Production Unit Inspection (FPUI)	Place of Manufacture
Production Verification Test (PVT)	Government Test Site
Quality Conformance Inspection (QCI)	Place of Manufacture
Follow-on Production Test (FPT)	Government Test Site

TITLE	**RQMTS**	**METHOD**	**FPUl**	**PVT**	**QCI**	**FPT**
Materials, Processes and Workmanship	3.3	4.3				
Materials*	3.3.1	4.3.1	x		x	
Corrosion Control*	3.3.2	4.3.2	x		x	
Treatment and Paint*	3.3.3	4.3.3	x		x	
Identification and Marking	3.3.4	4.3.4	x		x	
Workmanship	3.3.5	4.3.5	x		x	
Metal fabrication	3.3.6	4.3.6	x		x	
Welding*	3.3.7	4.3.7	x		x	
Parts Commonality	3.3.8	4.3.8	x			
FLA Commonality	3.3.8.1	4.3.8.1	x			
Performance Characteristics*	3.4	4.4		x		x
Loading/unloading	3.4.1	4.4.1		x		x
Engagement Height	3.4.2	4.4.2	x	x		x
Locking	3.4.3	4.4.3		x		x
Operational Times	3.4.5	4.4.5				
Deployment and Stowage Times	3.4.6	4.4.6		x		x

TITLE	RQMTS	METHOD	FPUl	PVT	QCI	FPT
CHU Stowage	3.4.7	4.4.7	x	x		x
FLA Stowage	3.4.7.1	4.4.7.1	x	x		x
Interface Securing	3.4.8	4.4.8	x	x		x
Environmental Conditions	3.4.9	4.4.9		x		x
Physical Environment	3.4.9.1	4.4.9.1		x		x
Physical Characteristics	3.5	4.5	x	x		x
Installation	3.5.1	4.5.1		x		x
Weight*	3.5.2	4.5.2	x	x	x	x
FLA Weight*	3.5.2.1	4.5.2.1	x	x	x	x
Dimensions*	3.5.3	4.5.3	x	x	x	x
Height*	3.5.3.1	4.5.3.1	x	x	x	x
Width*	3.5.3.2	4.5.3.2	x	x	x	x
Length*	3.5.3.3	4.5.3.3	x	x	x	x
Approach And Departure Angle	3.5.3.4	4.5.3.4		x		x
Fatigue	3.5.4	4.5.4		x		x
Lubricants and Fittings*	3.5.6	4.5.6	x	x	x	x
Electrical System*	3.5.7	4.5.7	x	x	x	x
Human Factors Engineering	3.5.8	4.5.8		x		x
Safety	3.5.9	4.5.9		x		x
Transportability	3.5.10	4.5.10		x		x
Maintainability	3.5.11	4.5.11		x		x
Maintenance Ratio	3.5.11.1	4.5.11.1		x		x
Durability	3.5.12	4.5.12		x		x

* Indicates Certification Requirements (4.1.4) apply.

4.1.6 Inspection Conditions. Unless otherwise specified the inspections cited in Table I may be conducted at any ambient temperature between -50 degrees F and (-46 degrees C) and +I20 degrees F (49 degrees C) at any ambient humidity, solar radiation, and precipitation and within the mission profile.

4.2 First Article Test

4.2.1 First Production Unit inspection (FPUI)

4.2.1.2 In-process Inspection. During fabrication of the first production unit (ref 3.2), in-process inspections will be conducted by Government representatives to evaluate conformance of materials and workmanship to requirements of specified

documents. The end items and all components shall be available for inspection. These inspections shall be made at the contractor's manufacturing facility prior to and after the application of primer and paint. Processing, weld procedures, quality system, inspection records, calibration procedures, radiographic procedures and welder certifications will be reviewed and evaluated during in-process inspections.

4.2.2 Completed First Production Unit Inspection

4.2.2.1 Contractor Inspection. The first production units shall be inspected by the contractor at the place of manufacture. The FPUl shall include at a minimum, the inspections referenced in Table I and make available all inspection records and certifications. Upon completion of the inspection the contractor shall submit the units to the responsible Government inspection element at contractor's plant for preliminary inspection. The Government, at its option may elect to witness and participate in the contractor inspections.

4.2.2.2 Government Provisional Inspection. The first production units shall be subject to provisional inspection at the contractor's plant by representatives of the Government procuring activity. At the time of this inspection the contractor shall make available higher inspection plan, inspection records and certifications pertinent to the units and its components. The contractor shall provide inspection assistance upon request.

4.2.2.3 Repair of Defects. Defects found as a result of above inspection shall be corrected by the contractor at no additional cost to the Government. Failure of the contract to promptly correct defects shall be cause for suspension of acceptance of production units until corrective action has been accomplished.

4.2.2.4 Unit Disposition. After completion of inspection, the first production unit shall remain at the manufacturing facility, as the manufacturing standard, and be the last unit delivered on the contract. The unit(s) may be released sooner at the discretion of the PCO. The contractor shall service and maintain the unit(s) during this period in accordance with applicable documents for care and preservation while in storage. All configuration changes taken place after FPUl shall be applied to the first production unit(s) so that these unit(s) will be representative of the current configuration throughout the life of the contract. No configuration changes may be implemented on production units after Government approval of the first production unit without written Government approval.

4.2.2.5 Final Approval and Acceptance. Final approval and acceptance by the Government of the first production unit(s) shall be withheld until the PVT has been successfully completed and final determination made regarding conformity of the unit(s) to contractual specification requirements including, but not limited to, workmanship and materials.

4.2.3 Production Verification Test (PVT). To determine conformance to Section 3 (inclusive) and after completion of FPUl (4.2.l), production representative CHU's shall be selected by the Government for PVT. The selected CHU's will be subjected to 1,000 load/unload cycles and a 6,000 mile durability test as outlined in Tables II, Ill and IV. These are in addition to the tests referenced in Table I. Durability miles shall be accrued with the CHU in the stowed position, carrying a container at rated load, carrying an empty container and with the CHU in the deployed position but not carrying a container as outlined inTable IV.

TABLE II

6,000 MILE HEMTT-LHS DURABILITY TEST PROFILE

% **TERRAIN**	**%/MILES**	**MAX SPEEDS SAFE UP TO**
15 Hard Surface	15/900	55 MPH
75 Secondary Road	75/4500	45 MPH
5 Cross Country - Level	5/300	30 MPH
5 Cross Country - Hilly	5/300	15 MPH

6,000 MILE PLS DURABILITY TEST PROFILE

% **TERRAIN**	**%/MILES**	**MAX SPEEDS SAFE UP TO**
25 Hard Surface	25/1500	55 MPH
25 Hilly Secondary Road	25/1500	45 MPH
25 Level Secondary Road	25/1500	45 MPH
10 Hilly Trails	10/600	30 MPH
10 Level Trails	10/600	30 MPH
2.5 Hilly Rough Trails	2.5/150	15 MPH
2.5 Level Rough Trails	2.5/150	15 MPH

4.2.3.1 Test Deficiencies. Deficiencies found during or as a result of the PVT, shall be cause for rejection of the CHU's until evidence has been provided by the contractor that corrective action has been taken to eliminate the deficiency. Any deficiency found shall be prima facie evidence that CHU's already accepted are similarly deficient, unless evidence satisfactory to the PCO is furnished, by the contractor, that they are not similarly deficient. Such deficiencies on all CHU's shall be corrected by the contractor at no additional cost to the Government. Corrective action, carried out as a result of deficiencies found during or as a result of PVT, shall be successfully/fully retested to that portion of the PVT. Retest costs are the responsibility of the contractor.

4.2.4 Quality Conformance inspection (QCI).

4.2.4.1 Final Inspection of each Production Unit. Each production CHU kit shall be subjected to a complete final inspection by the contractor as described in

4.2.4.2 and Table I. The government at its option may elect to participate in the final inspection.

4.2.4.2 Quality Conformance Examination. Each CHU kit shall be inspected by the contractor and shall include, as a minimum, those examinations/tests referenced in Table I. The purpose of the final inspection is to verify conformance of produced end items to the requirements of this specification. The inspections shall be conducted utilizing a contractor prepared and government approved Final Inspection Record (FIR).

4.2.4.3 Examination or Test Failure. If any installed CHU Assembly fails to pass any examinations or tests (4.2.4.2) specified herein, the Government shall withhold acceptance until evidence has been provided by the contractor that corrective action has been taken to correct such deficiencies.

4.2.5 Follow-on Production Test (FPT). The Government may randomly select a CHU kit at any time during the production contract period for vehicle installation and subject this CHU kit to all applicable tests referenced in Table I (minimum) as well as a 6,000 mile (9,654 km) durability test. Tests shall be conducted by the Government at a Government test site. All CHU's shall be subjected to Quality Conformance Inspection by the contractor in accordance with 4.2.4.

4.2.5.1 Test Deficiencies. Deficiencies found during or as a result of the FPT, shall be prima facie evidence that all CHU's produced since PVT or the last acceptable FPT are similarly deficient. This shall be cause for rejection of all CHU's produced since the last acceptable test, unless evidence to the contrary is produced which is satisfactory to the PC0 or until corrective action has been taken to repair and correct the deficiency. Such deficiencies on all CHU's shall be corrected by the contractor at no additional cost to the Government. Corrective action carried out as a result of FPT deficiencies shall be successfully demonstrated during a full retest of that portion of the FPT. Retest costs are the responsibility of the contractor.

4.2.5.2 Method of Inspection. The examinations and tests depicted in Section 4 are the minimum required to determine a conformance to the requirements delineated in Section 3 of this purchase description. Additional examinations and tests by the contractor may be required to determine conformance to specification requirements. The Government reserves authority to conduct the inspections depicted in Section 4.1.5 and additional inspections/tests at its discretion to determine conformance to specification requirements.

4.3 Materials, Processes and Workmanship.

4.3.1 Materials. All material shall be certified to be new and unused or processed to be new and unused. All structural fasteners shall be certified Grade 5 or higher.

4.3.1.1 Recovered Materials. For purposes of this document, recovered materials are those materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified herein, all components, materials and articles incorporated into the CHU shall be newly fabricated from recovered material to the maximum extent practical provided the CHU meets all other requirements of this document. The contractor shall verify by certification that used, rebuilt or remanufactured components, pieces and parts shall not be incorporated into the CHU.

4.3.2 Corrosion Control. The contractor shall certify that surfaces not painted or subject to relative movement or wear shall have the inherent ability to resist corrosion. Structural components of the CHU shall be examined for evidence of Stage I corrosion after completion of testing. Dissimilar metal joints shall be examined for electrical insulation.

4.3.3 Treatment and Painting. Thickness and adhesion tests shall be performed IAW MIL-DTL-53072. Certification shall be furnished that the CHU was cleaned, treated, primed and painted in accordance with MIL-DTL-53072. Topcoat color shall be examined to be Black - chip #37030.

4.3.4 Identification and Marking. The CHU shall be examined for the presence of a caution plate identifying the height and maximum payload of the PLS-CHU and HEMTT-LHS-CHU, and an identification plate. The CHU shall be examined for the presence of applicable instruction, caution and operating data plates for either the PLS or HEMTT-LHS truck. During testing of the CHU, these plates shall be evaluated for adequacy of information provided, including operating instructions, cautions, and procedures. All data plates shall be examined to be secured with screws, bolts, or rivets. During and subsequent to testing the data plates shall be examined for continued operation in spite of precipitation, washing, or solar radiation.

4.3.5 Workmanship. During all testing and examinations cited herein all parts, component and assemblies of the CHU kit, including castings, forgings, molded parts, stampings, seals, machined surfaces and welded parts shall be subject to examination to be clean and free from defects that shall reduce the capability of the CHU to meet the requirements specified herein and all surfaces to be free from burrs, slag, sharp edges and corners except where sharp edges and corners are required.

4.3.6 Metal Fabrication. Metal used in the fabrication of either CHU kit shall be examined to be free from kinks and sharp bends. The forming of material shall be certified as done by methods that will not cause injury to the metal. Shearing and clipping shall be examined to be neat and accurate. Corners shall be examined to be square and true.. Burned surfaces or flame-cut material shall be examined

to be free of slag. All bends of a major character shall be examined to be made with controlled means in order to insure uniformity of size and shape. Precautions shall be taken to avoid overheating shall be evaluated.

4.3.7 Welding. The contractor shall certify that all welding is IAW AWS Dl .l, Dl .2 Dl .3 and Dl 4.3. Welds shall be visually examined. Welder certifications shall be examined to validate compliance with AWS D1.1, D1.2 D1.3 and D14.3.

4.3.8 Parts Commonality. The contractor shall certify that the PLS CHU kit and the HEMTT-LHS CHU kit share a minimum of 75% of their parts.

4.3.8.1 FLA Commonality. The Contractor shall certify that the PLS FLA and HEMTT FLA are 100% interchangeable IAW 3.3.8.1.

4.4 Performance Characteristics. The contractor shall certify that the PLS installed CHU assembly can be safely operated with loads up to and including 36,250 pounds. The contractor shall provide test certification that the HEMTT-LHS installed CHU can be safely operated with loads(including flatrack and CHU components) up to 26,000 pounds. The center of gravity (CG) of the container, on both PLS and HEMTT-LHS, shall be measured to be located no greater than 31 inches above the base of the container (bottom of the bottom corner castings). On both PLS and HEMTT-LHS, the CG of the IS0 container shall be measured to be within 2 inches of the side to side center (8' width). Longitudinally, the CG of the PLS shall be measured to be within 12 inches of the end to end center (20' length) of the IS0 container. Longitudinally, the CG of the HEMTT-LHS shall be measured to be between 94 and 100 inches from the inside front wall of the IS0 container.

4.4.1 Loading/Unloading. Using a PLS truck and HEMTT-LHS the CHU (FLA) shall demonstrate the ability of engaging containers on 10% ground slopes (pitch), with 0% to 10% of yaw and with 0% to 10% of roll. These conditions shall occur independently or concurrently. Verify while lifting/loading the container that the CHU automatically guides and centers the container onto the truck. The CHU shall also demonstrate unloading a container at gross weight to ground slopes of 10% with the truck either horizontal or on the slope. While loading or unloading the CHU shall guide the container to prevent damage to the PLS truck/HEMTT-LHS, LHS or container.

4.4.2 Engagement Height. The CHU shall demonstrate that it is capable of lifting and loading an IS0 container onto a PLS truck/HEMTT-LHS when the bottom of the IS0 container is resting on a surface that is 12 inches below and 5 feet above ground level.

4.4.3 Locking. The CHU shall be inspected for the presence of transit locks to secure the container to the PLS truck/HEMTT-LHS and FLA to the container. The locks shall be effective in all phases of the PLS and HEMTT-LHS mission profiles

as defined in ATPD 2304, Tables VI and VII "20,000 Mile Durability Test Profile" and sections 3,6 and Tables I, 11, Ill and IV of this specification. If a lockout system is used there shall be no movement of the LHS when the CHU is installed with a container on board and the transit locks engaged. The locks shall be examined for the ability to be removed from the truck.

4.4.4 Reserved

4.4.5 Operational Times. The operational times shall be verified as defined in Section 3 of this specification.

4.4.6 PLS Truck Deployment and Stowage Times. Using MOS 88M and 55B soldiers the time required to deploy and stow the CHU as defined in Section 3 shall be verified.

4.4.7 CHU Stowage. With the CHU (FLA) in the stowed position on the PLS truck with a M1077 and M1 flatrack being loaded/unloaded, visually verify that there is no interference between these items and the CHU or the PLS truck and the CHU. After the Durability Mileage Table II the CHU shall not have degraded the operational capabilities of the PLS truck or components.

4.4.7.1 PLS Truck/HEMTT-LHS Front Lift Adapter (FLA) Stowage. The FLA shall demonstrate the ability to be freestanding on unimproved terrain with a maximum slope of 10% and a minimum RCI of 43 when removed from the truck

4.4.8 Interface Securing. With the CHU kit installed, before, during and after the Durability mileage of Tables I, II, Ill and IV the CHU shall be examined and demonstrate that there is no evidence of fatigue cracking, damage or deformation of any kind to the CHU assembly, Flatracks OR PLS truck/HEMTT-LHS.

4.4.9 Environmental Conditions. The CHU shall demonstrate the ability to operate in all operational environments and temperature ranges (-50 to +1600F, (-46 to 71C))of the PLS truck/HEMTT-LHS as defined in ATPD 2304. The CHU shall be examined to assure there shall be no evidence of cracking, binding, damage or degraded operation of the PLS truck/HEMTT-LHS or permanent deformation of any kind. All components shall be evaluated to be designed to allow for easy use with bare hands and when wearing Arctic mittens.

4.4.9.1 Physical Environment. The installed CHU assembly shall demonstrate the ability to operate in adverse climatic conditions (snow, ice, rain, sand, mud or dust on components). The CHU shall also demonstrate the ability to retrieve and load an IS0 container when the corner castings are submerged 6 inches above top of the castings mud, unpacked snow or sand without binding, damage or permanent deformation to the CHU or PLS truck/HEMTT-LHS.

4.5 Physical Characteristics.

4.5.1 Installation. The PLS shall be visually inspected to verify that no welding, cutting, drilling or grinding was required when installing the CHU. Welding may be required to mount the proximity switch brackets and flags on the PLS and HEMTT-LHS. This is the only time when welding may be permitted when installing the CHU kit.

4.5.2 Weight. The Contractor shall certify the installed weight of the CHU (Total CHU kit weight minus the weight of the parts removed from the truck) shall not the weight specified by the contract.

4.5.3 Dimensions.

4.5.3.1 Height. At highway tire pressure and with an eight (8) foot IS0 container on board the PLS and HEMTT-LHS overall height shall be measured. These configurations shall not exceed 14 (fourteen) feet (4.27m) in height.

4.5.3.2 Width. With the CHU installed the width of the PLS shall be measured. This measurement shall not exceed 102" (2591 mm) (excluding mirrors and marker lamps).

4.5.3.3 Length. With the CHU installed a measurement shall be taken to verify that the CHU does not exceed 35 inches from the vertical surface of the rear cross member. With the CHU installed verify the ability of the rear marker and tail lights to meet the requirements of FMVSS 108.

4.5.3.4 Approach and Departure Angles. With the CHU in the operational configuration on the PLS truck, the PLS truck shall be operated to demonstrate that the Approach and Departure Angles are not less than
32 degrees as defined in SAE J1100.

4.5.4 Fatigue. The CHU loaded to a weight of 36,250 pounds Gross Weight (GW)(6.3.3) shall be subjected to 3000 loading and unloading cycles using a PLS truck or test stand. The GW shall be distributed as defined in Paragraph 3.5.4. The load distribution and cycles shall be as follows:

Number of load/Unload Cycles	**Load Distribution in IS0 Container**
1800	Uniform over entire length
600	Uniform over front 3/4 of length
600	Uniform over rear 3/4 of length

The CHU shall be examined for no evidence of fatigue cracking, damage, accelerated wear or permanent deformation of any kind to the CHU or PLS truck (if used) after completion of the fatigue strength test.

4.5.6 Lubricants and Fittings. The CHU shall be examined to be delivered fully lubed. The contractor shall certify all lubricants and oils to MIL-PRF-2104 and MIL-PRF-46167. All fittings shall be examined to be protected from accidental impact and shall conform to SAE-J534.

4.5.7 Electrical System. To meet the requirements of Section 3 all electrical connections shall demonstrate the ability to hook up to existing PLS Wiring harnesses/connections. All electrical connections shall be examined to be made of steel or hard plastic and shall be tested to be waterproof. The contractor shall certify all wiring to SAE J1128 and splices/terminals to SAE J163 and to be 14 gauge.

All wiring shall demonstrate during testing that it is protected from accidental contact with troops, terrain and vegetation.

4.5.8 Human Factors Engineering. To meet the requirements of Section 3 the CHU shall demonstrate operation by MOS 88M and 55B personnel. The CHU shall demonstrate operability in all environmental conditions specified in ATPD 2304. The operation of the CHU, including stowing and deploying, shall demonstrate that it does not exceed the physical capabilities of the MOS 88M and 55B (6.3.8). The CHU shall be examined for operations that would be inhibited by soldiers wearing the full range of Army clothing, including Arctic and MOPP IV. For tasks that cannot be accomplished from the ground the CHU shall be examined for integral handholds and steps.

4.5.9 Safety. The contractor shall identify and certify compliance with the applicable parts of OSHA 29, CFR Part 1910, Subparts A, B, D,G,H,J,M,O,S, and Z. The CHU shall be examined and tested to expose operators and maintenance personnel reciprocating, rotating, or moving parts, hot surfaces, components containing high pressures or other inherently hazardous components or system which are not allowed. Electrical equipment shall be examined to be effectively guarded and grounded to protect for electrical shock hazard. The CHU shall be examined for the elimination of nonfunctional sharp edges, projecting points, excessive length of fastening devises. The CHU and its stowage methods shall demonstrate that personnel are not required to be in a position where an injury could be caused by a falling or collapsing part when operating it as designed. The CHU shall demonstrate during testing that precipitation in the form of rain or snow will not cause hazards from electrical, reciprocating, or rotating parts.

4.5.10 Transportability. The contractor shall certify that the CHU does not degrade the transportability of the PLS truck. The CHU shall demonstrate that it does not interfere with the lifting and tiedown procedures of the PLS truck with the CHU installed and all CHU components attached and in the stowed position and carrying a loaded flatrack. The PLS truck and HEMTT-LHS with the CHU (FLA) and its installed components in the stowed or transport position shall pass

a rail impact test in accordance with Appendix A. The PLS truck and HEMTT-LHS with CHUS assembly in container mode, carrying a container at gross vehicle weight, shall pass a rail impact test IAW Appendix A. The CHU shall demonstrate that it does not degrade the transportability of the PLS truck/HEMTT-LHS. There shall be no evidence of fatigue cracking, accelerated wear, damage or permanent deformation of the PLS truck/HEMTT-LHS the CHU or its components when examined subsequent to testing. Additionally, the rail impact test shall be performed on one of the CHU units on each of the configurations (PLS and HEMTT-LHS) that has completed durability testing (4.5.12).

4.5.1.1 Maintainability. The installed CHU assembly shall demonstrate the ability to meet the maintainability requirements as defined in Section 3 of this specification.

4.5.1.1.1 Maintenance Ratio. The installed CHU assembly shall demonstrate the ability to meet the Maintenance Ratio of 0.0560 as defined in Section 3 of this specification.

4.5.12 Durability. The installed CHU assembly on the number and type of vehicles as cited in the contract will be subjected to a 6,000 mile test and 1,000 load/unload cycles. The CHU will be subjected to examination subsequent to any testing, at the Government's discretion, to verify that there is no evidence of permanent deformation or fatigue cracking of any of the CHU assemblies major components which includes but is not limited to slides/rollers, FLA, bail bar, and container locks (pins, hooks wristlocks, etc.). The durability testing will be conducted with the installed CHU assembly in the four Configurations and total miles shown in Table IV. The 1000 load/unload cycles shall be conducted throughout the course of the 6,000 mile test.

TABLE lll

6,000 MILE PLS DURABILITY TEST PROFILE

%	**TERRAIN**	**%/MILES**	**MAX SPEEDS SAFE UP TO**
25	Hard Surface	25/1500	55 MPH
25	Hilly Secondary Road	25/1500	45 MPH
25	Level Secondary Road	25/1500	45 MPH
10	Hilly Trails	10/600	30 MPH
10	Level Trails	10/600	30 MPH
2.5	Hilly Rough Trails	2.5/150	15 MPH
2.5	Level Rough Trails	2.5/150	15 MPH

6,000 MILE HEMTT-LHS DURABILITY TEST PROFILE

%	**TERRAIN**	**%/MILES**	**MAX SPEEDS SAFE UP TO**
15	Hard Surface	15/900	55 MPH
75	Secondary Road	75/4500	45 MPH
5	Cross Country - Level	5/300	30 MPH
5	Cross Country - Hilly	5/300	15 MPH

TABLE IV

DURABILITY TEST CHU CONFIGURATION (Both PLS and HEMTT-LHS)

Configuration	% **of Test Miles**	**Total Miles**
Carrying an Unloaded Container	10	600
In Container Mode w/o a Container Loaded (Ready Mode)	20	1200
Stowed Position w/ Flatrack (FLA on PLS Truck only)	30	1800
Carrying a Container at Gross Weight	40	2400

5. PACKAGING.

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2).

6. NOTES.
(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory)

6.1 Intended use. The intended use of this item is to enhance the ability of the PLS system to perform its mission of combat service support, through the transport of intermodal and tactical loads from the corps area forward.

6.2 Acquisition Requirements. Acquisition documents must specify the following:
a. Title, number and date of the purchase description.
b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2)
c. Number of test items required.

6.3 Definitions. For the purpose of this purchase description the following definitions shall apply.
6.3.1 Mission Profile. The percent of miles of the mission profile for the CHU is the same as the percentages of miles in the mission profile for the PLS truck and HEMTT-LHS found in Tables VI and VII of ATPD 2304 "20,000 Mile Durability Test Profile".

6.3.3 Gross Weight. The gross weight is defined as the weight of the FLA, container, and cargo in the container.

6.3.4 Curb Weight. The curb Weight is the weight of the installed CHU assembly and the empty container being transported.

6.3.5 Cycle. One complete cycle shall consist of a load cycle, a transport cycle and an unload cycle.

6.3.5.1 Load Cycle. The loading cycle shall consist of the following operations: Align the FLA with the container after the operator has positioned the truck the proper distance from the container and within 10% of centerline, engaging the container's corner castings, lifting and loading the container onto the truck, and locking the container to the truck.

6.3.5.2 Transport Cycle. A transport cycle shall follow the profile below:

PLS Transport Cycle

Terrain Profile	Percent of Cycle	Typical Speed (mph)	Peak Speed (mph)
Primary	25	55	62
Secondary	50	45	52
Trails	20	30	37
Rough Trails	5	15	22

HEMTT-LHS Transport Cycle

Terrain Profile	Percent of Cycle	Typical Speed (mph)	Peak Speed (mph)
Primary	15	55	62
Secondary	75	45	52
Cross Country - Level	5	30	37
Cross Country - Hilly	5	15	22

6.3.5.2.1 Primary Roads. Two or more lanes, all weather, maintained, hard surface (paved) roads with good driving visibility used fro heavy and high density traffic. These roads have lanes with a minimum width of 108 inches (2.75 M), road crown to 20 degrees and the legal maximum GWV/GCW for the country or state is assured for all bridges. These roads are surfaces having Root Mean Square (RMS) value of 0.1 inch (2.54 mm).

6.3.5.2.2 Secondary roads. Two lanes, all weather, occasionally maintained, hard or loose surface (e.g. large rock, paved, crushed rock, gravel) intended for medium-weight, low-density traffic. These roads have lanes with minimum width of 98.5 inches (2.5 m) and no guarantee that the legal maximum GWV/GCW for the country or state is assured for all bridges. These roads are surfaces having a RMS value varying between 0.3 inch (7.63 mm) - 0.6 inch (1 5.24 mm).

6.3.5.2.3 Trails. One lane, dry weather, unimproved, seldom maintained loose surface roads, intended for low density traffic. Trails have a minimum width of 98.5 inches (2.5 M), no large obstacles (boulders, logs, stumps) and no bridging. These are surfaces having an RMS value varying between 0.5 inches (12.7 mm) - 1.5 inches (38.1 mm).

6.3.5.2.4 Rough Trails. Vehicle operations over terrain not subject to repeated traffic in addition, no roads, routes, well-worn trails or man made improvements exist (This definition does not apply to vehicle test courses which are used to simulate cross-country terrain). These are surfaces having an RMS value varying between 1.5 inches (38.1 mm) - 2.0 inches (50.8 mm).
6.3.5.3 Unload Cvcle. Unlocking the container from the truck, unloading the container to the ground, disengaging the FLA from the container, moving the LHS and FLA to unloaded transport position.

6.3.5.4 Stow Cycle. Completely converting the CHU from operational configuration to stowed (flatrack) configuration and back to operational configuration. This includes stowing the FLA on the PLS truck and stowing the FLA on the ground with the standing leg for the HEMTT-LHS truck
6.3.6 Dissimilar Metals. Two metal specimens that are in contact or otherwise electrically connected to each other in a conductive solution and generate an electric current.

6.3.7 Galvanic corrosion. The accelerated corrosion caused to the more active metal (anode) of a dissimilar metal couple in an electrolyte solution or medium, and decreased corrosive effects on the less active metal (cathode), as compared tot he corrosion of the individual metals, when not connected, in the same electrolyte environment. A listing of galvanic series and ways of preventing galvanic corrosion can be found in MIL-STD-889.

6.3.8 Physical Requirements. The physical requirements of MOS 88M and 55B from AR 61 1-201 states that soldiers with this qualification are capable of occasionally lifting over 100 pounds and constantly lifting over 50 pounds. AR 61 1-201 further defines the physical capability of the 88M to be capable of occasional lifts and pulls of 130 pounds and constantly lifting and pivots of 342 pounds as part of a 2 solider team (prorated 171 pounds per solider). The 558 is defined as being capable of lifting 72 pounds 4 feet and carring it 10 feet and carry 150 pounds 10 feet.

6.3.9 Tare Weight. The tare weight is defined as the difference in the weight of the PLS truck after the installation of the CHU.

6.3.10 Vehicle Cone Index (VCI). The minimum soil strength in the critical soil layer in terms of RCI for fine grained soils, and CI for coarse grained soils, required for a specific number number of passes of a vehicle. VCI_1 indicates only 1 (one) pass.

6.3.1 1 Remolding Index. A ratio that expresses the proportion of original strength of a medium that will remain under a moving vehicle. The ratio is determined from CI measurements made before and after remolding a 6 inch long sample using special apparatus.

6.3.12 Ratina Cone Index (RCI). The product of the measured **CI** and the RI of the same layer.

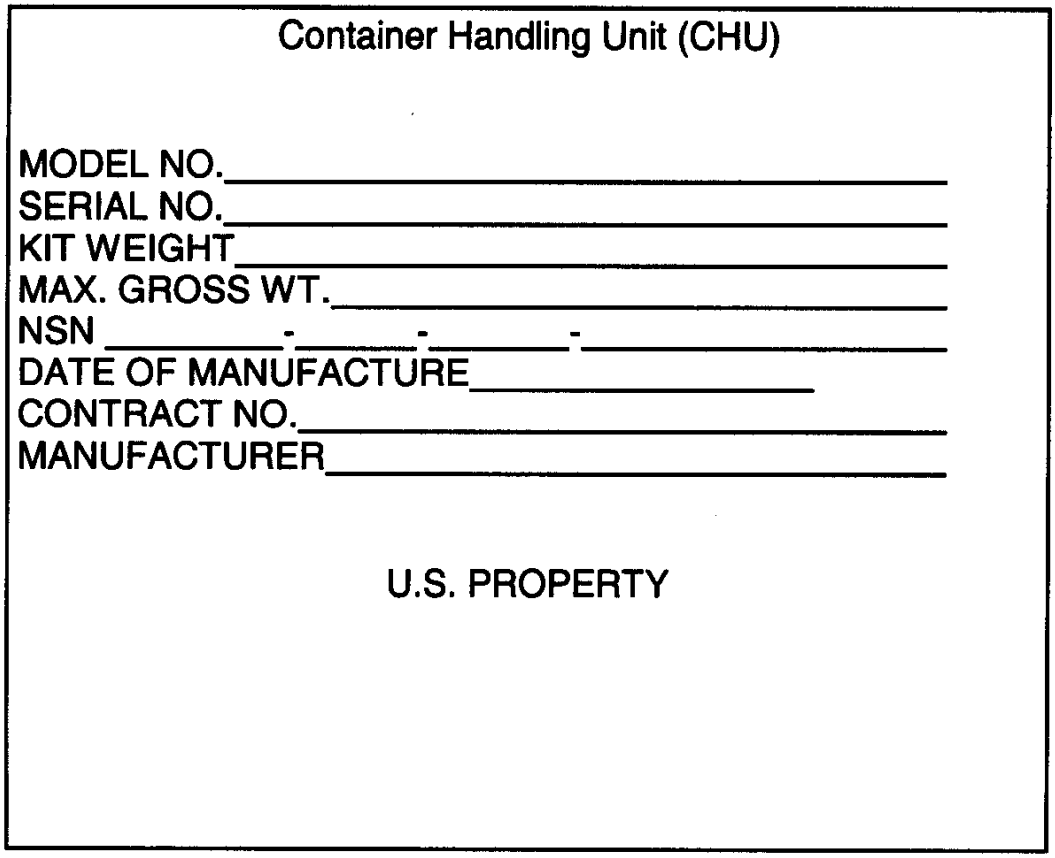
6.3.1 3 Cone Index (CI). An index of the shearing resistance of a medium at any depth by a penetrometer. The resistance to penetration by a 30 degree cone with a 0.5 square inch circular base is expressed in pounds of force on the handle per square inch of the base area. In the basic Waterways Experiment Station (WES) Vehicle Cone lndex (VCI) system the CI is considered as an index only, and no direct meaning is assigned to its dimensions.

6.3.14 Maximum Pavload Weight. The maximum payload weight of the PLS is 36,250 lbs. The maximum payload weight of the HEMTT-LHS is 26,000 lbs. The 26,000 lbs. payload of the HEMTT-LHS includes container, container load, and Front Lift Adapter.

6.3.15 Rail Shipment Configuration. Rail shipment configuration for the CHU is as mounted on the PLS or HEMTT LHS and the CHU at Gross Weight either with or without ammunition included in the payload.

Attachment 1

Figure 1: Identification Plate



Notes:
1. All letters shall be 0.25 inches high, black photoengraved except serial number.
2. Enter date by stamping at time of manufacture.
3. Kit weight and max. gross weight shall be marked in both pounds and kilograms.

APPENDIX A

RAIL IMPACT TEST PROCEDURE

A.1 SCOPE

A.1.1 Scope. This appendix details the procedure for conducting rail impact testing. This appendix is a mandatory part of this purchase description.

A.1.2 Purpose. This procedure is intended to test equipment that will be transported by rail; to determine the effect of normal railroad car impacts that occur during rail shipment, and to verify the structural integrity of the test item and the adequacy of the tiedown system and the tiedown procedures. All test items shall be tested at their maximum gross weight (fully loaded) rating unless otherwise specified in the transportability requirements for this item

A.1.3 Restrictions. This procedure is not intended for the separate testing of small, individually packaged pieces of equipment that would normally be shipped (and tested) when mounted on a pallet.

A.2 APPLICABLE DOCUMENTS. None

A.3 PROCEDURE

A.3.1 Test Conditions. This test is conducted by mounting the test item on a rail car in its rail shipment configuration and then performing a series of at least 4 impacts. The first three impacts shall be a 6.4, 9.7 and 13 krnh (4, 6, and 8.1 mph), respectively, in the same direction. The fourth shall be conducted at 13 kmlh in the reverse direction. All four impacts shall have a tolerance of +0.8, -0.0 krnh (+0.5, -0.0 mph). If the test commodity can be shipped in two orientations (such as lengthwise and crosswise on the rail car), the four impacts shall be repeated for each orientation.

A.3.2 Rationale. Data for the rail impact test were derived from statistical data on the frequency of impacts with relationship to speed and frequency of occurrence. Brakes are set on the buffer car to provide a more conservative test.

A.3.3 Failure Analvsis. A test item shall be classified as not having survived the rail impact test and will be deemed a test failure if any item that is attached to or included as a n integral part of the test item breaks free, loosens or shows any sign of permanent deformation beyond specification tolerances. A test item that passes this procedure should be capable of rail transport without damage to the item or tiedowns.

A.3.4 Test Procedure.

Step 1. Position from one to five rail cars on a level section of track. Satisfy the following conditions:

a. Adjust the total weight of the car assemblages to at least 114,000 kilograms (250,000 pounds).
b. Compress the couplers between the cars to take up any slack.
c. Set all the air and hand brakes on the car(s) to be used.
d. Secure any load on the car(s) to prevent sliding or shifting: any movement greater than 5 cm (1.97 in) shall be justification for retest.
e. The end of the buffer car to be struck must have a cushioned draft gear.

Step 2. Mount the test item on the test car. The test car shall be equipped with standard draft gears and conventional underframes. The material developer is responsible for the development of transportation instructions, and shall coordinate these with, and obtain approval from the Military Traffic Management Command Transportation Engineering Agency (MTMCTEA), well in advance of rail impact testing. Mounting of the test item shall incorporate the standard loading and bracing methods as shown in Section 6 of the Association Of American Railroads (AAR) "Rules Governing the Loading of Department of Defense Material on Open Top Cars.*" No exotic or unusual tiedown methods shall be used; any non-standard loading and bracing must be approved by the Military Traffic Management Command Transportation Engineering Agency (MTMCTEA), ATTN: MTTE-DPE, 720 Thimble Shoals Blvd., Suite 130, Newport News, VA 23606-2574 (or its European equivalent) prior to testing. The arrangement of the test item and its blocking and tiedown to be tested shall be identical to that proposed and approved by MTMCTEA (if non-standard).

* This requirement is mandatory for all equipment developed for use in the U.S. Equivalent European standards may apply for non-U.S. commodities.

Step 3. Situate the test car between the buffer cars and the locomotive, and pull the test car at least 65 meters (200 feet) from the buffer car(s) along a level section of track (a minimum distance to achieve the required locomotive speeds).

Step 4. Position the knuckles of the buffer and test cars for coupling.

Step 5. install a timing device to measure the test car speed (+0.1 km/h (+0.06 mph)) just prior to impact with the buffer car(s). Suggested methods include electronic timing (microswitches) and radar. The use of torpedoes and a stopwatch is permissible but not recommended because of the inaccuracies involved.

Step 6. Push the test car toward the buffer car(s) and, by using the locomotive's speedometer or other means, release the test car when the desired speed is reached, thus allowing the test car to freely impact the buffer car(s).

NOTE: Any impacts below the required test speeds shall be repeated. Impacts above the required test speed shall be accepted providing the requirements of paragraph V are satisfied. Retesting shall be accomplished with new tiedown material to eliminate additive effects and, if possible, a new test item.

Step 7. Repeat Step 6 until the test car has impacted the buffer car(s) three times at the same end, once each at speeds 6.4, 9.7, and 13 krnh (4, 6 and 8.1 mph) +0.8, -0.0 krnh (+0.5, -0.0 mph). Reverse the test car and repeat the 13 krnh (8.1 mph) impact, for a total of 4 impacts.

NOTE: Adjustments of the lading or securing mechanisms, or reconditioning of the bracing or items of securement are not allowed during the test. If the tiedowns or chock blocks become loose during test, a decision to completely retest will be made by MTMCTEA or the test director.

Step 8. Repeat Steps 1-7 for any other shipping orientation.

Step 9. Record the pertinent information for each impact, to include the following:
a. Complete test item identification.
b. The number and speed of impacts.
c. Observations of tiedown, blocking, fittings, etc.
d. Observations of the test item's physical condition.
e. Results of any operational checks.

NOTE: Cargo requiring extraordinary attention, i.e. nuclear, one-of-a-kind, high value, or key military equipment, may justify changes to the test procedure and criteria; these shall be identified by the developer or Program Manager, and approved by the Director, Military Traffic Management Command Transportation Engineering Agency (MTMCTEA), ATTN: MTTE-DPE, 720 Thimble Shoals Blvd., Suite 130, Newport News, VA 23606-2574 (or its European equivalent).

Attachment 2